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FLOOD INSURANCE STUDY

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CITY OF WATERTOWN, WISCONSIN

DODGE AND JEFFERSON COUNTIES

OCTOBER 1, 1980

federal emergency management agency
federal insurance administration

COMMUNITY NUMBER - 550107

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PUBLISHED SEPARATELY:

Flood Insurance Rate Map

FLOOD INSURANCE STUDY

CITY OF WATERTOWN,
JEFFERSON COUNTY, WISCONSIN

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the City of Watertown, Jefferson County, Wisconsin, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study will be used to convert the City of Watertown to the regular program of flood insurance by the Federal Insurance Administration (FIA). Local and regional planners will use this study in their efforts to promote sound flood plain management.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than those on which these Federally-supported studies are based. These criteria take precedence over the minimum Federal criteria for purposes of regulating development in the flood plain, as set forth in the Code of Federal Regulations at 44 CFR, 60.1 (d). In such cases, however, it shall be understood that the state (or other jurisdictional agency) shall be able to explain these requirements and criteria.

1.2 Authority and Acknowledgements

The source of authority for this Flood Insurance Study is the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were performed by the U.S. Geological Survey, for the Federal Insurance Administration, under Inter-Agency Agreement No. IAA-H-9-77, Project Order No. 25. This study was completed in February 1979.

1.3 Coordination

Streams to be studied by detailed or approximate methods were identified at an initial coordination and time and cost meeting on December 21, 1976. Flood elevations, flood boundaries, and floodway delineations were coordinated with the U.S. Geological Survey (USGS), the Wisconsin Department of Natural Resources, and the City of Watertown. Base maps were obtained from the City of Watertown.

On April 29, 1980, the results of the work by the Study Contractor were reviewed and accepted at a final coordination meeting attended by representatives of the FIA, the Study Contractor, and the City of Watertown.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the City of Watertown. The area of study is shown on the Vicinity Map (Figure 1).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas, and areas of projected development or proposed construction for the next five years, through February 1984.

Approximate methods of analysis were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to and agreed upon by the FIA and the City of Watertown.

The flooding sources studied by detailed methods are listed below:

a. the Rock River, within the corporate limits, a distance of approximately 5.4 miles; and

b. Silver Creek, from its mouth at the Rock River to the upstream corporate limit, a distance of approximately 0.61 mile.

Unnamed Tributary, within the corporate limits, was studied by approximate methods.

2.2 Community Description

The City of Watertown is centrally located on the line between Dodge and Jefferson Counties in southeastern Wisconsin. It is surrounded on all sides by county lands. Adjacent communities include the City of Milwaulkee, located 42 miles to the east, and the City of Madison, located 34 miles to the west. According to the 1970 census, the population was 15,683, and it was estimated to have grown to 17,236 in 1978 (Reference 1).

Temperatures in Watertown in the summer range from an average monthly high of 72 degrees Fahrenheit (F.) in July, to an average monthly low of 62 degrees F. in September. Winter temperatures range from an average monthly high of 33 degrees F. in March, to an average monthly low of 20 degrees F. in January. The annual precipitation is 31 inches (Reference 2).

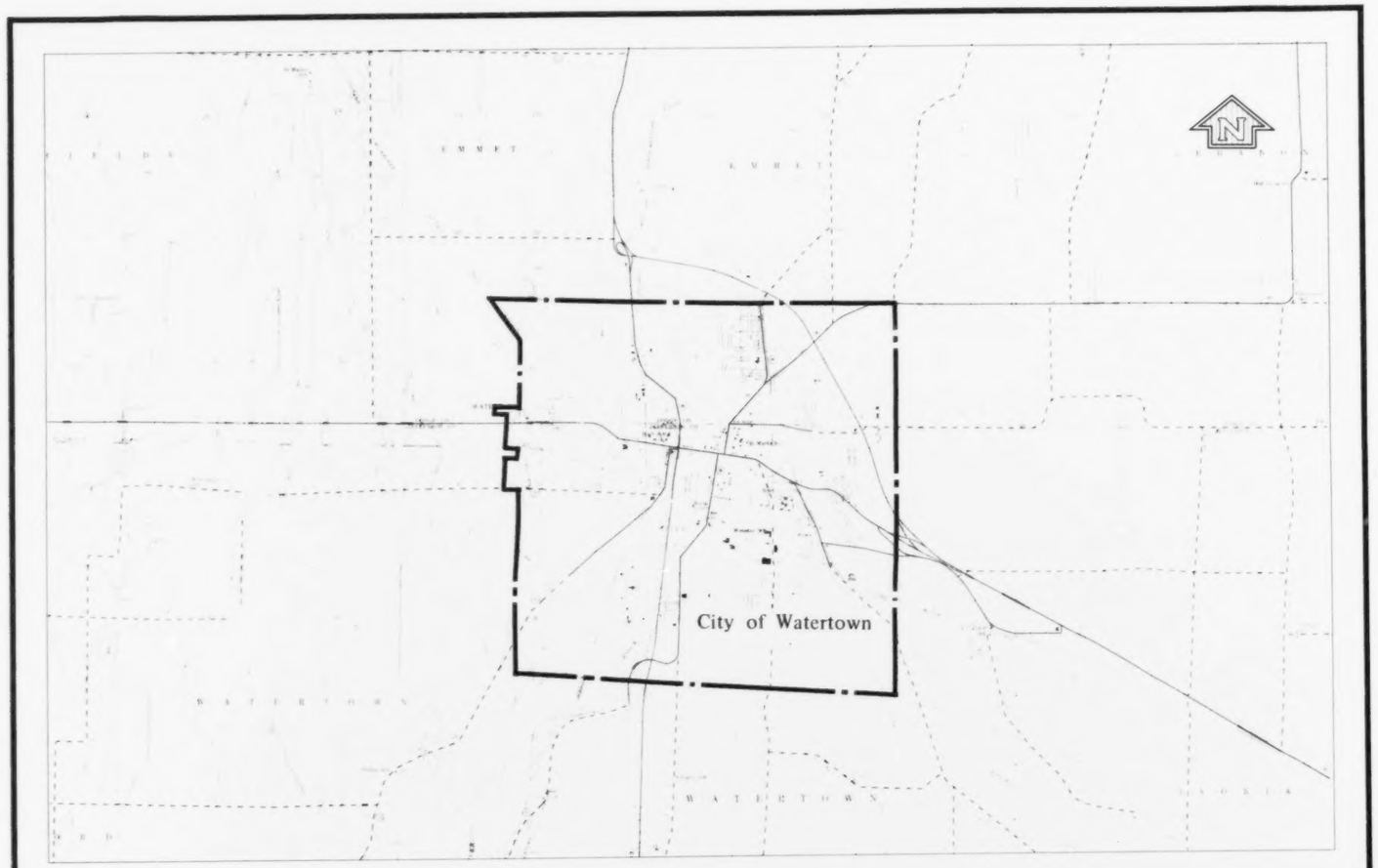


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

Federal Insurance Administration

CITY OF WATERTOWN, WI

(DODGE AND JEFFERSON COS.)

APPROXIMATE SCALE

5715 0 5715 11,430 17,145 FEET

VICINITY MAP

Surface features within the vicinity of Watertown are characteristic of glaciated regions with level to rolling and hilly land. The average elevation is about 850 feet with a local relief of about 50 feet. Drumlins are prominent features over the entire area. These elongated narrow hills of unsorted glacial drift lie parallel to the direction of glacial ice movement with a north-south orientation around the City of Watertown (References 3 and 4).

Soils within this region result almost entirely from combinations of atmospheric, chemical, and organic forces working to modify the surface drift. Soils are generally classified as upland silt loams of good agricultural potential. These soils are generally well-drained. Soils associated with the drumlins are of medium texture and derived from unsorted glacial drift. Growth and subsequent decay of marsh vegetation in the many depressions has led to the formation of peat soils in some areas (References 3 and 4).

Most of the basin upstream from Watertown consists of cropland and pasture. Wetlands and lakes are estimated to be 15 percent of the basin.

The headwaters of the Rock River are in southwestern Fond du Lac County. The Rock River flows in a general southerly direction through the State of Wisconsin, continuing southerly through Illinois, becoming a tributary to the Mississippi River approximately 240 miles from the City of Watertown. The Rock River is the major system draining the area surrounding Watertown. The water course has a steep gradient through the Watertown area compared to other reaches of the Rock River. Drainage patterns are generally controlled by drumlins which force a parallel drainage pattern on the streams (Reference 4).

The city is expanding in most directions. The majority of recent development is north of the Rock River, between the river and U.S. Highway 16, on both sides of the Rock River near the upper dam, and south of Clark Street on the south side of the city. Some residential platting has occurred in the flood plain of Silver Creek and near unnamed tributaries north of the Rock River. Development is insignificant in the Rock River flood plain.

2.3 Principal Flood Problems

The most significant factor in affecting flood magnitudes is runoff from spring rainfall often with snowmelt on frozen (impervious) ground. Major flooding can also result from intense thunderstorms in the summer and fall. According to information from a local resident and weatherman, the worst flooding in approximately 50 years was in the early spring of 1959 when there was rain and snowmelt on top of frozen ground. This inundated many low lying areas, flooded basements and caused some damage. No other information about the flood is available.

2.4 Flood Protection Measures

There are two concrete dams on the Rock River in Watertown, neither of which are significant for flood protection. Stages upstream from the dams are, of course, higher than they would be if the dams did not exist.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equalled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance premium rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equalled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than one year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (one percent chance of annual occurrence) in any 50-year period is about 40 percent (four in ten), and for any 90-year period, the risk increases to about 60 percent (six in ten). The analyses reported here reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for floods of the selected recurrence intervals for each flooding source studied in detail affecting the community.

The Rock River discharges were based on a frequency study of annual peak discharges at the Watertown gaging station (no. 054255) which has been in operation since 1932.

The discharges for the 10-, 50-, 100-, and 500-year floods on the Rock River were obtained from the Flood Insurance Study for Jefferson County, Wisconsin (Reference 5). These figures were also used in two previous studies done on the Rock River (References 6 and 7). However, using a zero skew in a log-Pearson Type III analysis a 100-year discharge of 6,480 cubic feet per second (cfs) was developed. This compares lower than the 7,130 cfs figure used in this report. It is believed that the latter figure better depicts flooding discharges in the Watertown area, as well as falling within the 50 percent confidence interval of the first figure.

Regional flood-frequency equations developed by Conger were used to compute the flood discharges for Silver Creek (Reference 8).

Discharges for the 10-, 50-, 100-, and 500-year floods on Rock River and Silver Creek were submitted to the Wisconsin Department of Natural Resources for review and comment.

Peak discharges for the 10-, 50-, 100-, and 500-year floods of each flooding source studied in detail in the community are shown in Table 1.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (SQ MILES)	PEAK DISCHARGE (CFS) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
ROCK RIVER					
At gaging station (no. 05-4255) in Watertown	971	4,070	6,200	7,130	10,200
SILVER CREEK					
At mouth	22	540	1,040	1,300	2,200

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of the streams in the community were carried out to provide estimates of the elevations of the floods of the selected recurrence intervals along each flooding source studied in detail.

Channel cross sections were obtained by field surveys, as were the bridge, dam, and culvert geometrics.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Roughness factors (Manning's "n") were estimated on the basis of field observations and photographs of the channel. Roughness values for the Rock River range from 0.035 to 0.045 in the channel, and from 0.035 to 0.060 in the overbank. Values for Silver Creek ranged from 0.032 to 0.045 in the channel and from 0.035 to 0.085 in the overbank.

Starting elevations for the Rock River at the corporate limits were taken from a previous Flood Insurance Study of Jefferson County (Reference 5).

The starting elvation for Silver Creek was taken from the calculated 10-year flood elevation of the Rock River at the mouth of Silver Creek.

Water-surface profiles of the 10-, 50-, 100-, and 500-year floods on the Rock River and Silver Creek were computed using the USGS E-431 step-backwater digital computer model (Reference 9). Input to the computer model consisted of stream-valley cross sections, bridge geometry, surface roughness, and peak-discharge data. Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals (Exhibit 1).

The elevations on the lake located on the Rock River were developed using an extention of a standard rating curve at the Lower Watertown Dam. Elevations on this lake for the 10-, 50-, 100-, and 500-year floods are listed below:

10-YEAR	50-YEAR	100-YEAR	500-YEAR
810.45	811.35	811.74	812.82

The hydraulic analyses for this study are based only on the effects of unobstructed flow. The flood elevations as shown on the profiles are, therefore, considered valid only if hydraulic structures, in general, remain unobstructed and if channel and overbank conditions remain essentially the same as ascertained during this study.

All elevations are referenced from National Geodetic Vertical Datum of 1929 (NGVD); elevation reference marks used in the study are shown on the maps.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages state and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study includes a flood boundary map designed to assist communities in developing sound flood plain management measures.

4.1 Flood Boundaries

In order to provide a national standard without regional discrimination, the 100-year flood has been adopted by the FIA as the base flood for purposes of flood plain management measures. The 500-year flood is employed to indicate additional areas of flood risk in the community. For each stream studied in detail, the boundaries of the 100-year and the 500-year floods have been delineated using the elevations determined at each cross section; between cross sections the boundaries were interpolated using the left and right effective flow limits of each cross section.

The approximate study flood boundaries for the Unnamed Tributary were estimated by use of aerial photos (Reference 10), maps (Reference 11), and field inspection.

In addition, two other sources of flooding were identified in the southeast and northeast portions of the community. Through the use of aerial photographs (Reference 10), maps (Reference 11), field inspection, and the Flood Hazard Boundary Map (Reference 12), boundaries have been assigned to these streams. Due to their small drainage areas, a Zone B designation has been used.

The boundaries of the 100- and 500-year floods are shown on the Flood Boundary and Floodway Map (Exhibit 2). Small areas within the flood boundaries may lie above the flood elevations and, therefore, not be subject to flooding; owing to lack of detailed topographical information or to limitations of the map scale, such areas are not shown. In cases where the 100-year and the 500-year flood boundaries are close together, only the 100-year boundary has been shown.

4.2 Floodways

Encroachment on flood plains, such as artificial fill, reduces the flood-carrying capacity, increases the flood heights of streams, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, the concept of a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood is divided into a floodway and a floodway fringe. The floodway is the channel of a stream plus any adjacent flood plain areas that must be kept free of encroachment in order that the 100-year flood may be carried without substantial increases in flood heights. Minimum standards of the FIA limit such increases in flood heights to 1.0 foot, provided that hazardous velocities are not produced. However, the Wisconsin Department of Natural Resources has established a policy that limits encroachment in the flood plain to 0.1 foot (Reference 13).

Natural flood profiles were calculated using the available effective flow area. The floodway boundary, due to the limiting low surcharge and topographic characteristics of the valley, is equivalent to the 100-year flood boundary except for areas that have no conveyance. The results of these analyses are tabulated at each cross section for which a floodway was computed (Table 2).

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were determined at cross sections; between cross sections, the boundaries were interpolated. In cases where the boundaries of the

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC.)	REGULATORY (NGVD)	WITHOUT FLOODWAY (NGVD)	WITH FLOODWAY (NGVD)	INCREASE (FEET)
ROCK RIVER								
A	236.17	376	3310	2.2	793.3	793.3	793.3	0.0
B	236.32	454	3210	2.2	793.4	793.4	793.4	0.0
C	236.44	420	2910	2.5	793.6	793.6	793.6	0.0
D	236.50	544	4120	1.7	793.7	793.7	793.7	0.0
E	236.88	362	1760	4.1	794.5	794.5	794.5	0.0
F	237.25	424	1920	3.7	797.0	797.0	797.0	0.0
G	237.31	303	1830	3.9	797.3	797.3	797.3	0.0
H	237.60	177	1100	6.5	799.5	799.5	799.5	0.0
I	237.65	150	930	7.7	800.0	800.0	800.0	0.0
J	237.78	220	1360	5.2	801.8	801.8	801.8	0.0
K	237.82	198	1240	5.8	802.1	802.1	802.1	0.0
L	237.89	248	1480	4.8	802.9	802.9	802.9	0.0
M	240.47	490	3540	2.0	824.7	824.7	824.7	0.0
N	240.59	590	4340	1.6	824.8	824.8	824.8	0.0
O	240.62	388	2920	2.4	825.0	825.0	825.0	0.0
P	240.88	383	2810	2.5	825.2	825.2	825.2	0.0
SILVER CREEK								
A	0.00	64	246	5.3	811.7	810.5[3]	810.5	0.0
B	0.01	71	255	5.1	811.7	810.6[3]	810.6	0.0
C	0.13	108	415	3.1	811.7	811.5[3]	811.5	0.0
D	0.28	161	389	3.3	812.3	812.3	812.3	0.0
E	0.46	467	985	1.3	813.4	813.4	813.4	0.0
F	0.61	473[2]	882	1.5	813.8	813.8	813.8	0.0

[1]MILES ABOVE MOUTH
[2]THIS WIDTH EXTENDS BEYOND CORPORATE LIMIT
[3]ELEVATIONS WITHOUT CONSIDERING BACKWATER EFFECT FROM ROCK RIVER

TABLE 2

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration
CITY OF WATERTOWN, WI
(DODGE AND JEFFERSON COS.)

FLOODWAY DATA

ROCK RIVER - SILVER CREEK

floodway and the 100-year flood are either close together or collinear, only the floodway boundary has been shown.

The area between the floodway and the boundary of the 100-year flood is termed the floodway fringe. The floodway fringe thus encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood more than 0.1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

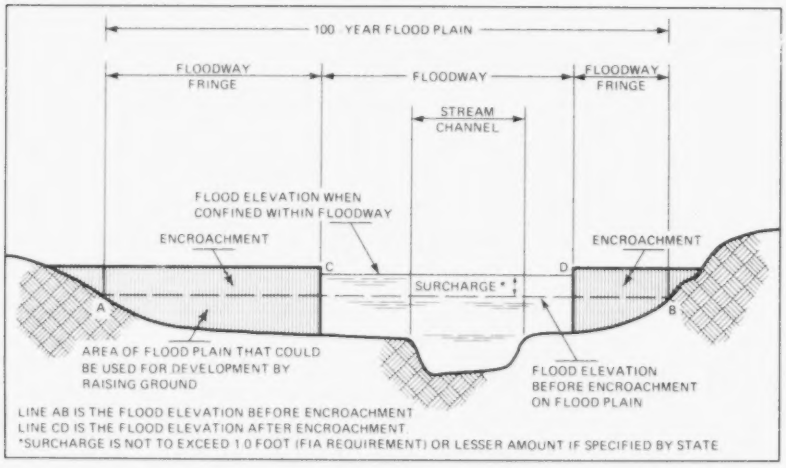

100 - YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE *
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE AB IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE CD IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE IS NOT TO EXCEED 1.0 FOOT (FIA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FIGURE 2 - Floodway Schematic

5.0 INSURANCE APPLICATION

In order to establish actuarial insurance rates, the FIA has developed a process to transform the data from the engineering study into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors (FHF), and flood insurance zone designations for each flooding source affecting the City of Watertown.

5.1 Reach Determinations

Reaches are defined as lengths of watercourses having relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference does not have a variation greater than that indicated in the following table for more than 20 percent of the reach.

Average Difference Between 10- and 100-year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the City of Watertown are shown on the Flood Profiles (Exhibit 1) and are summarized in the Flood Insurance Zone Data Table (Table 3).

5.2 Flood Hazard Factors

The FHF is used to correlate flood information with insurance rate tables. Correlations between property damage from floods and their FHFs are used to set actuarial insurance premium rate tables based on FHFs from 005 to 200.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations expressed to the nearest 0.5 foot, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year water-surface elevations is greater than 10.0 feet, accuracy for the FHF is to the nearest foot.

5.3 Flood Insurance Zones

After the determination of reaches and their respective FHFs, the City of Watertown was divided into zones, each having a specific flood potential or hazard. Each zone was assigned one of the following flood insurance zone designations:

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations are shown or FHFs determined. FHF.
Zones A2, A3, A4, A7:	Special Flood Hazard Areas inundated by the 100-year flood, determined by detailed methods; base flood elevations are shown, and zones subdivided according to FHF.

Zone B:	Areas between the Special Flood Hazard Area and the limits of the 500-year flood, including areas of the 500-year flood plain that are protected from the 100-year flood by dike, levee, or other water control structure; or areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.
Zone C:	Areas of minimal flooding.

Table 3, "Flood Insurance Zone Data," summarizes the flood elevation differences, FHFs, flood insurance zones, and base flood elevations for each flooding source studied in detail in the community.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the City of Watertown is, for insurance purposes, the principal result of the Flood Insurance Study. This map (published separately) contains the official delineation of flood insurance zones and base flood elevation lines. Base flood elevation lines show the locations of the expected whole-foot water-surface elevations of the base (100-year) flood. This map is developed in accordance with the latest flood insurance map preparation guidelines published by the FIA.

6.0 OTHER STUDIES

The 100-year flood plain and floodway were determined by a previous study by the USGS and the Department of Natural Resources (Reference 5). Areas inundated by regional floods along the Rock River in northeastern Jefferson County, including Watertown, are shown in the hydrologic atlas for this vicinity (Reference 6). A Flood Insurance Study was done for unincorporated areas in Jefferson County (Reference 5) that included flood profiles for the Rock River through Watertown except the area between the two dams (Reference 7). The data presented in this report agree with those previously published except as noted below. This report additionally includes a 500-year flood boundary for the Rock River, the 100-year floodway and flood boundary, and 500-year flood boundary for Silver Creek, and approximate 100-year flood boundaries for lowlands and a tributary north of the Rock River.

Flood hazard factors for the Rock River do not agree with those from the Jefferson County Flood Insurance Study at the corporate limits. This is because the reaches within the corporate limits used to determine the flood hazard factors are only small sections of larger reaches used in the Jefferson County Flood Insurance Study.

FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FLOOD HAZARD FACTOR	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10-YEAR)	2% (50-YEAR)	0.2% (500-YEAR)			
ROCK RIVER							
REACH 1	0005	–3.3	–1.1	3.6	035	A7	VARIES–SEE MAP
REACH 2	0005	–1.8	–0.5	1.7	020	A4	VARIES–SEE MAP
REACH 3	0005	–1.5	–0.5	1.0	015	A3	VARIES–SEE MAP
SILVER CREEK							
REACH 1	0005	–1.0	–0.3	1.1	010	A2	VARIES–SEE MAP
UNNAMED LAKE							
REACH 1	0005	–1.5	–0.5	1.0	015	A3	812

[1]FLOOD INSURANCE RATE MAP PANEL
[2]WEIGHTED AVERAGE
[3]ROUNDED TO NEAREST FOOT

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration
CITY OF WATERTOWN, WI
(DODGE AND JEFFERSON COS.)

FLOOD INSURANCE ZONE DATA

ROCK RIVER - SILVER CREEK - UNNAMED LAKE

A Flood Hazard Boundary Map has been published by the Federal Insurance Administration (Reference 12). The differences between the Flood Hazard Boundary Map and this study are justified due to the more detailed nature of this Flood Insurance Study.

This report either supersedes or is compatible with all previous studies published on streams studied in this report and should be considered authoritative for the purposes of the National Flood Insurance Program.

7.0 LOCATION OF DATA

Survey, hydrologic, hydraulic and other pertinent data used in this study can be obtained by contacting the Insurance and Mitigation Division, Federal Emergency Management Agency, One North Dearborn Street, Chicago, Illinois 60602.

8.0 REFERENCES AND BIBLIOGRAPHY

1. Wisconsin Department of Administration, Demographic Services Center, Official Population Estimates for 1978, October 1978.

2. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Monthly Normals of Temperature, Precipitation, and Heating and Cooling Degree Days, 1941-70, August 1973.

3. Wisconsin Conservation Department, Surface Water Resources of Dodge County, Ronald J. Poff, Ronald Piening, and C.W. Threinen, 1968.

4. U.S. Department of Natural Resources, Surface Water Resources of Jefferson County, Wisconsin, Ronald J. Poff, Ronald Piening, and C.W. Threinen, 1968.

5. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Jefferson County, Wisconsin, 1978.

6. U.S. Geological Survey and U.S. Department of Natural Resources, Rock River in Vicinity of Watertown, Wisconsin, Flood Plain and Floodway Delineation, 1970.

7. U.S. Geological Survey, Hydrologic Investigations Atlas HA-394, Floods on Rock River in Northeastern Jefferson County, Wisconsin, J.O. Shearman, and B.K. Holmstrom, 1971.

8. U.S. Geological Survey, Open-File Report, Estimating Magnitude and Frequency of Floods in Wisconsin, D.H. Conger, 1971.

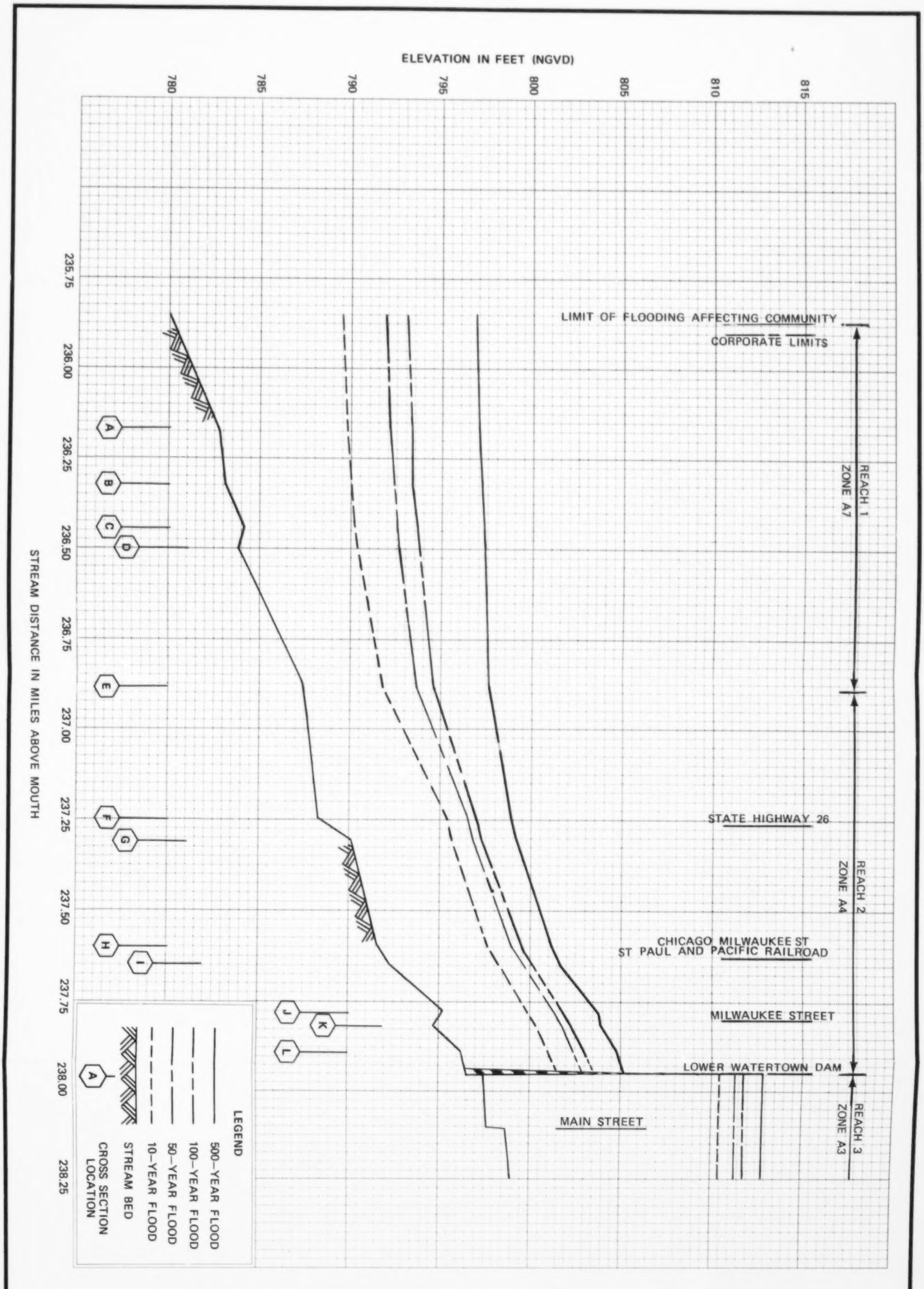
9. ----------, Open-File Report 76-499, Computer Applications for Step-Backwater and Floodway Analyses, J.O. Shearman, 1976.

10. U.S. Department of Agriculture, Agricultural Stabilization and Conservation Service, Aerial Photographs, Scale 1:40,000, 1971.

11. U.S. Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24000, Contour Interval 10 feet: Watertown, Wisconsin, 1971.

12. U.S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, City of Watertown, Wisconsin, June 1976.

13. U.S. Department of Natural Resources, Wisconsin's Flood Plain Management Program, Chapter NR116, Register No. 259, 1977.



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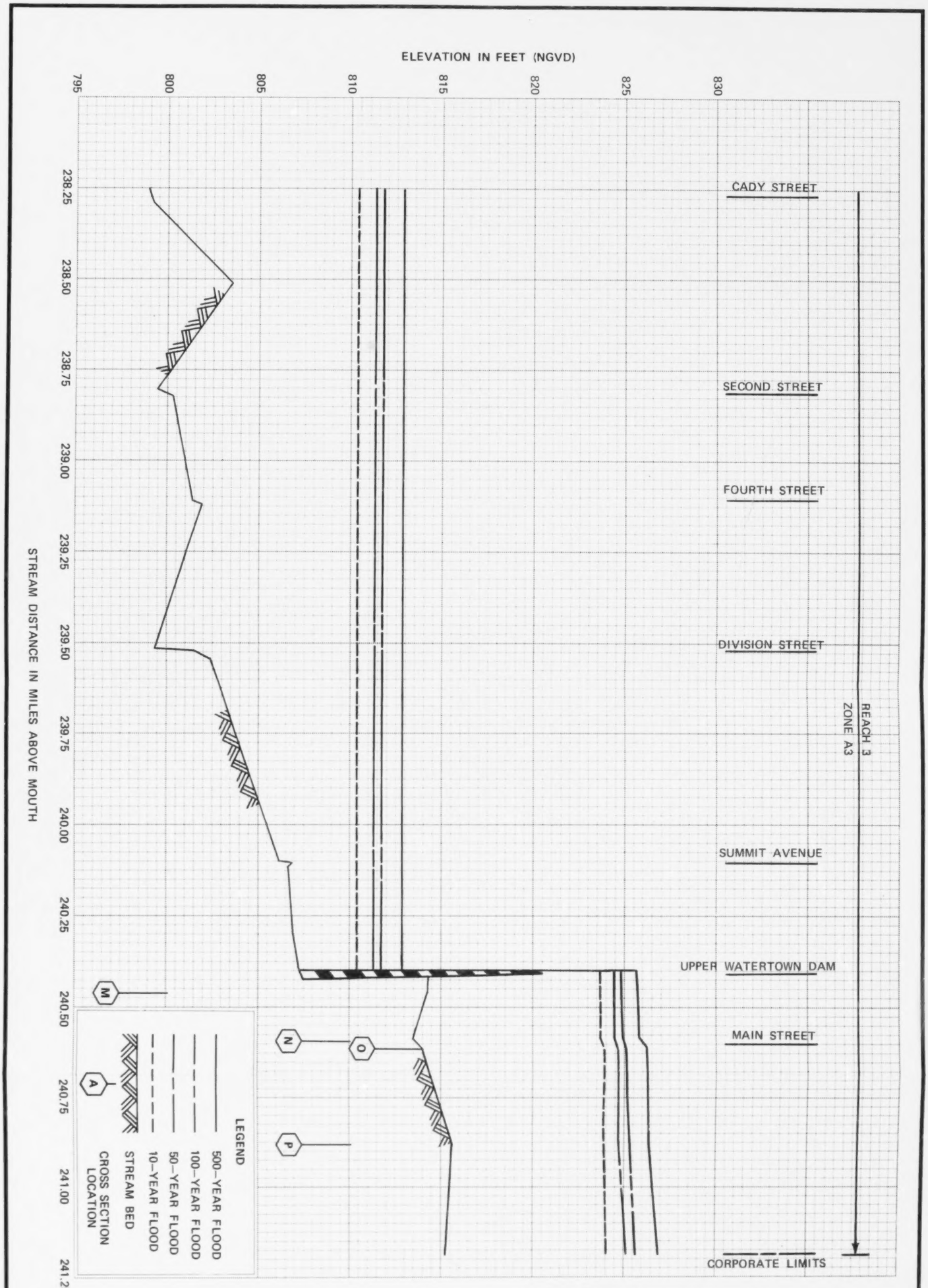
FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF WATERTOWN, WI
(DODGE AND JEFFERSON COS.)

FLOOD PROFILES

ROCK RIVER



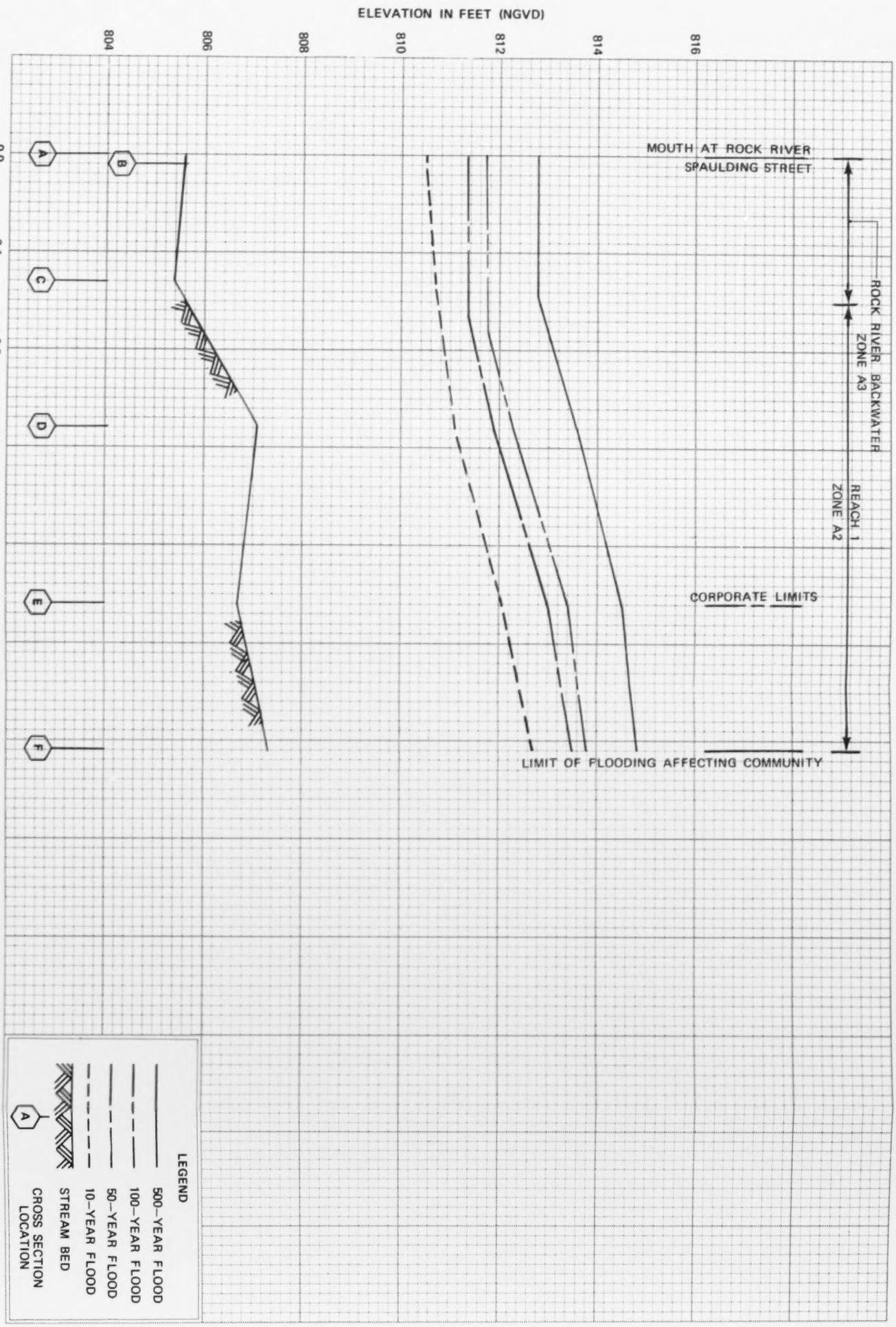
02P

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF WATERTOWN, WI
(DODGE AND JEFFERSON COS.)

FLOOD PROFILES

ROCK RIVER



03P	FEDERAL EMERGENCY MANAGEMENT AGENCY Federal Insurance Administration **CITY OF WATERTOWN, WI** (DODGE AND JEFFERSON COS.)	**FLOOD PROFILES** **SILVER CREEK**